REVISIONS TO THE STATE IMPLEMENTATION PLAN (SIP) FOR THE CONTROL OF OZONE AIR POLLUTION

POST 1996 RATE-OF-PROGRESS DEMONSTRATION FOR THE BEAUMONT–PORT ARTHUR NONATTAINMENT AREA

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LIST OF ACRONYMS

ASC - Area Source Categories
BACT - Best Available Control Technology
BEIS - Biogenic Emissions Inventory System
BEIS-2 - Biogenic Emissions Inventory System, version2
BELD - Biogenic Emissions Land Cover Database
BIOME - Biogenic Model for Emissions
BPA - Beaumont-Port Arthur Nonattainment Area
CFR - Code of Federal Regulations
CO - Carbon Monoxide
DOW - Day of Week
DV - Design Value
EDMS - Emissions and Dispersion Modeling System
EGAS - Economic Growth Analysis System
EI - Emissions Inventory
EIQ - Emissions Inventory Questionnaire
EPA - U.S. Environmental Protection Agency
ERC - Emission Reduction Credit
ERG - Eastern Research Group
ESAD - Emission Specification for the Attainment Demonstration
FCAA - Federal Clean Air Act
FMVCP - Federal Motor Vehicle Control Program
FR - Federal Register
GloBEIS - Global Biogenic Emissions Inventory System
HC - Hydrocarbon
HGB - Houston-Galveston-Brazoria Nonattainment Area
HGAC - Houston-Galveston Area Council
HPMS - Highway Performance Monitoring System
HON - Hazardous Organic NESHAP
ICI - Industrial, Commercial, and Institutional
IIG - Interim Implementation Guidance
IIP - Interim Implementation Plan
I/M - Inspection and Maintenance
MACT - Maximum Achievable Control Technology
MPO - Metropolitan Planning Organization
MVEB - Motor Vehicle Emissions Budget
NAAQS - National Ambient Air Quality Standard
NESHAP - National Emissions Standards for Hazardous Air Pollutants
NO_x - Nitrogen Oxides or Oxides of Nitrogen
O_3 - Ozone
OAQPS - Office of Air Quality Planning and Standards
OTAQ - Office of Transportation and Air Quality
PEI - Periodic Emissions Inventory
ppb - Parts Per Billion
ppm - Parts Per Million
ppmv - Parts Per Million by Volume
PSDB - Point Source Database

QA/QC - Quality Assurance/Quality Control
RACT - Reasonably Available Control Technology
ROP - Rate-of-Progress
SETRPC - Southeast Texas Regional Planning Commission
SIC - Standard Industrial Classification
SIP - State Implementation Plan
TAC - Texas Administrative Code
TACB - Texas Air Control Board
TCAA - Texas Clean Air Act
TCM - Transportation Control Measure
TIP - Transportation Implementation Program
TCEQ - Texas Commission on Environmental Quality (commission)
TPOD - Tons Per Ozone Day
TPY - Tons Per Year
TTI - Texas Transportation Institute
TxDOT - Texas Department of Transportation
UAM - Urban Airshed Model
VMEP - Voluntary Mobile Source Emissions Reduction Program
VMT - Vehicle Miles Traveled
VOC - Volatile Organic Compound

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EXECUTIVE SUMMARY

Section 182 of the FCAA Amendments of 1990 requires ozone nonattainment areas with air quality classified as moderate or worse to submit plans showing reasonable further progress/rate-of-progress (ROP) towards attainment of the NAAQS. The BPA area has recently been reclassified as a serious nonattainment area for the 1-hour ozone standard with an attainment date of 2005. The rate-of-progress[1] SIP is not required or intended to demonstrate attainment of the ozone NAAQS. It is intended as a demonstration of the effectiveness of the Texas emission control program in achieving 15 percent reduction in VOC by 1996 and a 3 percent per year reduction in ozone precursors, averaged over each consecutive three-year period beginning with 1996 and continuing through the attainment year. The end of each three year period is termed a milestone year and requires a ROP analysis. Serious areas have rate-of-progress milestone dates of 1996 and 1999. As the result of EPA's reclassification of the area with a 2005 attainment date, the additional milestone years 2002 and 2005 require a ROP analysis. For the BPA area, TCEQ has met the following milestone requirement: Submission of a 15 percent ROP SIP for reductions achieved between 1990 and 1996.

Due to the reclassification bump-up there are now three new ROP milestone analysis years for Beaumont:

- 1999;
- 2002; and
- 2005.

Since the last BPA ROP SIP update, the following changes have occurred:

- the BPA attainment demonstration SIP has been updated;
- the EPA has released NONROAD2002 (a new tool for estimating emissions from non-road sources;
- the EPA has released the MOBILE 6 model (a new tool for estimating emissions from on-road mobile sources; and
- The BPA Metropolitan Planning Organization (MPO) has updated the forecast on-road activity levels to include the effects of the latest census information and most recent transportation planning assumptions.

Therefore, due to the reclassification bump-up, and in order to maintain consistency with the attainment demonstration SIP and to have motor vehicle emissions budgets that reflect the latest on-road mobile tools and transportation planning assumptions, an ROP SIP update is required. Because the 1996 ROP requirements have previously been met, and because no conformity issues are associated with 1996 , BPA ROP update requirements can be met by updating the ROP analysis for the milestone years of 1999, 2002 and 2005.

This SIP demonstrates the updated Texas plan for meeting the post-1996 ROP requirements for the analysis periods of:

- 1990 to 1999;
- 1999 to 2002; and
- 2002 to 2005.

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[1] To help clarify the rate-of-progress terminology in this document a Glossary has been included at the end of Section 5.

Using a method approved by EPA to include the effect of MOBILE6 on the 1996 15 percent in the updated 1999 ROP analysis, the 1999 plan will demonstrate a total reduction of 24 percent. The 2002 and 2005 ROP plan will demonstrate a 9 percent ROP reduction for each milestone year. The target year inventories include all the latest information available to estimate emissions growth. Target levels for all three years also account for ROP corrections and non-creditable reductions. All the ROP inventories are based upon an ozone season weekday analysis. (Because the attainment demonstration inventories are based upon episode day analysis, and because activity levels, temperature and humidity may be different for a specific episode day relative to an average ozone season weekday, some differences are to be expected between the attainment demonstration inventories and the ROP inventories.)

There are two major ROP requirements, the 15 percent VOC reduction by 1996, and 3 percent per year reduction for either VOC or NOx for each year between 1996 and the attainment year. The 3 percent can be taken as:

- a VOC reduction;
- a NOx reduction; or
- a combination of NOx and VOC reductions that total 3 percent.

This SIP uses NOx and VOC reductions to meet the 1996 to 1999, and NOx only to meet the post-1999, 3 percent per year reduction requirement. The ROP methodology involves the following factors: development of the base year, determination of the 15 percent VOC and 3 percent NOx reduction requirements, development of the milestone year inventories, development of the emission reductions for each milestone year, and the development of an estimate of the effects of non-creditable reductions and pre-1990 CAAA rule corrections. Once these values have been analyzed the milestone target levels and emission inventories can be compared to determine if the forecast controlled emission inventory is less than the target level. The ROP SIP must demonstrate the emission reductions ~~that~~ will reduce the future emission inventories to a value less than the emissions target.

A summary of the uncontrolled milestone year inventories, the control strategies that are part of the Texas ROP plan, the control strategy reductions, the resulting controlled milestone year inventories, the target levels of emissions for each milestone year and a comparison of the controlled inventory to the target level of emissions is presented in Table ES-1. The comparison of the controlled target year inventories and the target level of emissions demonstrates that the ROP plan for BPA documented in this SIP meets the CAAA ROP requirements for all milestone years.

Table ES-1 Summary of Rate of Progress Demonstration Beaumont-Port Arthur Ozone Non-attainment Area

Description	1999		2002		2005	
	NOx	VOC	NOx	VOC	NOx	VOC
Uncontrolled Emissions Forecast	316.79	311.99	310.50	316.06	301.09	313.99
Control Reductions to Meet ROP						
Point Source: Federal, State, Local Point Source Controls (See Appendix 1- Sheet13 for details of point source	87.67	159.27	108.78	184.37	109.22	183.66

controls)						
On-road mobile: Post-1990 FMVCP	2.78	0.99	5.80	2.30	11.15	5.23
Non-road mobile:(See Appendix 1-Sheet 14)	1.13	1.71	2.27	3.17	3.62	5.55
Area Source: All area source control strategies are used as contingency measures in the ROP demonstration, therefore the reduction values are set to zero for the ROP milestone demonstration (see Appendix 1-Sheet 12 for details)	0.00	0.00	0.00	0.00	0.00	0.00
Controlled ROP Emissions Forecast	225.21	150.02	193.65	126.22	177.10	119.55
ROP Target Level of Emissions[1]	303.37	230.40	270.02	228.57	234.82	227.02
Is controlled emission forecast less than ROP target level of emissions?	Yes	Yes	Yes	Yes	Yes	Yes

Note 1: The ROP Target Level of Emissions is calculated by subtracting the 15% VOC reduction, the 3% per year reduction, the non-creditable reductions due to pre-1990 controls, and the RACT and I/M corrections from the base year inventory. All the elements to reproduce the value are not included in this table. Please refer to Appendix 1 for details concerning the calculation of the target level of emissions.

EPA requires all ROP and attainment demonstration SIPs to establish motor vehicle emissions budgets (MVEB) for transportation conformity purposes. Because this SIP demonstrates the updated Texas plan for meeting the post-1996 ROP requirements, it sets MVEBs for transportation conformity for the milestone years 1999, 2002 and 2005. An MVEB is the on-road mobile source allocation of the total allowable emissions for each applicable criteria pollutant or precursor, as defined in the SIP. Transportation conformity determinations must be performed using the budget test, once EPA determines the budget(s) adequate for transportation conformity purposes. In order to pass the budget test, areas must demonstrate that the estimated emissions from transportation plans, programs and projects do not cause the motor vehicle emissions budget(s) to be exceeded.

If the commission adopts additional control measures to reduce on-road motor vehicle emissions as a SIP revision, or if the commission submits a SIP update that includes modification of the on-road mobile inventory or control reduction values used to demonstrate ROP, the commission will concurrently revise the motor vehicle emissions budget(s) for the SIP and submit such revised budget(s) to EPA as a revision to the SIP. Although no new on-road mobile source controls have been adopted for the updated ROP plan presented in this SIP update, the on-road mobile emission inventories and control reduction values were updated using the latest EPA on-road mobile source inventory development tool, MOBILE6. Since the inventories and the control reductions values have therefore changed, the MVEBs are updated as part of this SIP revision. Chapter 5 documents the details of the development of revised ROP MVEBs for the 3-county BPA ozone nonattainment area. A summary of the revised MVEBs is presented in Table ES-2.

Table ES-2 ROP Motor Vehicle Emission Budgets for BPA

Description	NO_x tons per day	VOC tons per day
1999 ROP MVEB	57.17	20.52
2002 ROP MVEB	49.56	17.21
2005 ROP MVEB	33.97	12.59

CHAPTER 1: GENERAL

1.1 ROP Requirements

The FCAA Amendments of 1990 require a specified rate of emission reductions for all ozone areas classified as moderate and above. Section 182(b)(1) requires moderate and above areas to submit a SIP revision detailing how the area will achieve a reduction in VOC emissions of at least 15 percent between November 15, 1990 and November 15, 1996 (hereafter called the ROP demonstration). This ROP SIP was due November 15, 1993. The ROP requirement is based on the 1990 base-year emissions inventory, which all nonattainment areas were required to submit by November 15, 1992.

Section 182(c)(2) required all ozone nonattainment areas classified as serious and above to submit a SIP revision by November 15, 1994 to achieve additional emission reductions of 3 percent per year averaged over each consecutive 3-year period from November 15, 1996 until the area's attainment date (post 1996 ROP demonstration). This SIP revision was also required to describe how any growth in emissions over each applicable post-1996 period will be offset. In addition, 3 percent contingency measures must be adopted, to be implemented in the event that milestone reductions fail to occur.

The FCAA Amendments of 1990 also provide for crediting of VOC emission reductions achieved in the 1990-1996 period to the post-1996 ROP demonstration, if they are in excess of the 15 percent VOC reductions (net of growth) required between 1990 and 1996, and allow substitution of nitrogen oxides emission reductions (net of growth) occurring in the post-1990 period for the post-1996 VOC emission reductions requirements.

Demonstrating achievement of the 15 percent VOC emission reductions by November 15, 1996, and then subsequently demonstrating achievement of the 3 percent per year VOC or NOx emission reductions averaged over each consecutive 3-year period from November 15, 1996 until the attainment date, are termed milestone demonstrations.

1.2 BPA ROP Background

The BPA area, consisting of Hardin, Jefferson, and Orange counties, was originally classified as a "serious" ozone nonattainment area after the FCAA Amendments of 1990, with a November 15, 1999 compliance date for attaining the 1–hour ozone standard. Based on subsequent review of the BPA area's ozone monitoring data showing lower recorded ozone levels, EPA reclassified BPA as "moderate" on April 2, 1996.

Under FCAA Amendments of 1990 requirements for moderate areas, the state was required to submit a SIP for BPA demonstrating a 15 percent VOC emission reduction, net of growth, for the years between 1990 and 1996. That 15 percent ROP SIP was adopted by the commission on November 10, 1993 and May 13, 1994 and submitted to the EPA. Areas classified as serious and above are required by the FCAA to submit a 9 percent ROP SIP, achieving reductions of 3 percent per year, net of growth, for the years between 1996 and 1999, and every three years thereafter until attainment is reached. For these "post-1996" reductions, however, NO_x reductions may be substituted for VOC reductions. Because of BPA's reclassification to moderate, the 9 percent ROP SIP developed for BPA was withdrawn by the state.

The BPA area did not attain the 1-hour ozone standard by the November 15, 1996 deadline for moderate areas, and also did not attain the standard by November 15, 1999, the deadline for serious areas. As part of the initial negotiations, a proposed 24 percent ROP was put forward to meet the requirements of EPA's Transport Policy. EPA's letter of May 19, 1999 stated that reliance on the 24 percent ROP alone was not sufficient for an approvable attainment demonstration, and that additional reductions would be required. As

a result, the state eliminated the 24 percent ROP and instead developed a more stringent set of NO_x reductions to be achieved by rulemaking. The BPA SIP adopted by the commission on October 27, 1999 represented the first phase of these attainment demonstration NO_x reductions.

On April 19, 2000, the commission adopted the final attainment demonstration SIP for BPA, which included Phase II of the NO_x reductions The SIP included the following elements:

- A modeling demonstration showing 1) attainment of the 1-hour ozone standard and 2) transport of ozone and its precursors from Houston. The commission requested that BPA's attainment date be extended to that of the Houston area (November 15, 2007) based on EPA's ozone transport policy.
- A commitment to submit a mid-course review to EPA by May 1, 2004.
- Rules implementing the control strategy. Since the majority of NO_x emissions in BPA come from large industrial point sources, the attainment demonstration SIP relies primarily on point source NOx reductions.

The EPA approved the BPA SIP on May 14, 2001, with an attainment date of November 15, 2007. Environmental groups subsequently challenged EPA's extension of attainment dates based on transport; BPA was one of three areas in the nation for which suits were filed. On December 11, 2002, the Fifth Circuit Court of Appeals ruled that EPA is not authorized by the FCAA to extend the area's attainment date based on transport. On June 19, 2003, EPA proposed in the *Federal Register* to reclassify BPA to either serious or severe, with a November 2005 attainment date for either classification. Negotiations were held between the environmental litigants, BPA industries, EPA, and TCEQ to obtain commitments from BPA industries in providing voluntary reductions and other environmental benefits. EPA published final action in the *Federal Register* on March 30, 2004, reclassifying BPA to serious with an attainment date of November 15, 2005. According to EPA's notice, the state must submit a new attainment demonstration, showing attainment by 2005, within one year of the effective date of the action.

Additional requirements for the new attainment demonstration were set forth in EPA's March 30, 2004 *Federal Register* notice. These requirements are as follows:

a) Revise the Motor Vehicle Emissions Budget (MVEB) for 2005 using MOBILE6, EPA's mobile source emission factors model
b) Perform post-1996 Rate of Progress (ROP) analyses for 1999, 2002, and 2005
c) Perform a new Reasonably Available Control Measures (RACM) analysis for 2005
d) Activate contingency measures previously adopted under 15 percent ROP requirements
e) Provide additional contingency measures as part of the SIP to meet post-1996 through 2005 ROP requirements

This ROP analysis addresses items a), b) and e) above. The remaining items are addressed in the attainment demonstration SIP being adopted concurrently with this ROP SIP.

1.3 Public Hearing Information

The commission held public hearings at the following times and locations:

CITY	DATE	TIME	LOCATION
Houston	August 2, 2004	1:30 p.m. 5:30 p.m.	City Hall Council Chambers 901 Bagby
Beaumont	August 3, 2004	10:30 a.m.	John Gray Institute 855 East Florida Avenue
Austin	August 5, 2004	9:30 a.m.	Texas Commission on Environmental Quality 12100 Park 35 Circle Building F, Room 2210

Written comments were also accepted via mail and fax through August 9, 2004.

1.4 Social and Economic Considerations

For a detailed explanation of the social and economic issues involved with any of the strategies, please refer to the preambles that precede each proposed rule package accompanying this SIP.

1.5 Fiscal and Human Resources

The state has determined that its fiscal and manpower resources are adequate and will not be adversely affected through the implementation of this plan

CHAPTER 2: UPDATED EMISSION INVENTORIES

2.1 Overview of Methodologies and Assumptions

The FCAA Amendments of 1990 require that emission inventories be prepared for ozone nonattainment areas. Because ozone is photochemically produced in the atmosphere when VOCs are mixed with NO_X in the presence of sunlight, it is important that the agency compile information on the significant sources of these precursor pollutants. It is the role of the emissions inventory to identify the source types present in an area, the amount of each pollutant emitted, and the types of processes and control devices employed at each plant or source category. The emissions inventory provides data for a variety of air quality planning tasks, including establishing baseline emission levels, calculating reduction targets, control strategy development for achieving the required emission reductions, emission inputs into air quality simulation models, and tracking actual emission reductions against the established emissions growth and control budgets. The total inventory of emissions of VOC and NO_X for an area is summarized from the estimates developed for the five general categories of emission sources: stationary point, area, onroad mobile, nonroad mobile, and biogenics.

Some emissions data for the base year, milestone years and the attainment year emissions inventories were updated from the previous ROP SIP submittals. This was necessary due to significant changes in methods of calculating emissions and in the improvement in collecting more and better activity data that can be used in calculating emissions.

The same changes that apply to the inventories also apply to the calculation of control strategy emission reductions. When the inventories and control reductions change, it is necessary to reevaluate the controls that are used to demonstrate achievement of the ROP milestone and contingency year requirements. Therefore in addition to the inventory and control reduction updates, the controls used to demonstrate both ROP and contingency requirements have been updated.

Point sources. Major point source emissions and industrial process operating data are collected annually from sites that meet the reporting requirements of 30 Texas Administrative Code 101.10.

To collect emissions and industrial process operating data for these plants, the commission mails Emissions Inventory Questionnaire (EIQs) to all sources identified as meeting reporting requirements. Companies are required to report not only emissions data for all emissions generating units and emission points, but also the type and, for a representative sample of sources, the amount of materials used in the processes which result in emissions. Information is also requested in the EIQ on process equipment descriptions, operation schedules, emissions control devices currently in use, abatement device control efficiency, and stack parameters such as location, height, and exhaust gas flow rate. All data submitted via the EIQ is then subjected to quality assurance procedures and entered into an electronic data base. Additional information is available upon request from the Technical Analysis Division of the TCEQ.

Area sources. Area sources are commercial, small-scale industrial and residential categories of sources which use materials or operate processes which can generate emissions. Area sources are too small to meet the reporting criteria for major point sources and emissions are calculated as county-wide totals rather than as individual facilities. Area sources can be divided into two groups characterized by the emission mechanism: hydrocarbon evaporative emissions or fuel combustion emissions. Examples of evaporative sources include: printing, industrial coatings, degreasing solvents, house paints, leaking underground storage tanks, gasoline service station underground tank filling, and vehicle refueling operations. Fuel combustion sources include stationary source fossil fuel combustion at residences and businesses, as well as outdoor refuse burning, structural fires, and wildfires. These emissions, with some exceptions, may be calculated

by multiplication of an established emission factor (emissions per unit of activity) times the appropriate activity or activity surrogate responsible for generating emissions. Population is the most commonly used activity surrogate for many area sources, while other activity data include amount of gasoline sold in an area, employment by industry type, and acres of cropland.

Nonroad mobile sources. Nonroad mobile sources include aircraft operations, marine vessels, recreational boats, railroad locomotives, and a very large assortment of other off-highway equipment from 600-horsepower engines mounted on construction equipment to 1-horsepower string trimmers. Methods for calculating emissions from nonroad engine sources are based on information about equipment population, engine horsepower and load factor, emission factors, and annual usage. Emission estimates for all sources in the nonroad category except aircraft, locomotives, commercial marine vessels, diesel construction equipment, and airport support equipment were originally developed by a contractor to EPA's Office of Transportation Air Quality as a 1990 emissions inventory. Emissions were originally projected to later years based on EPA's Economic Growth Analysis System (EGAS) model. Subsequently, several projects using improved methodologies revised the inventory for some categories. Each major nonroad mobile source category has a unique method for emission calculations. EPA's NONROAD model was developed to calculate emissions from all nonroad mobile categories except aircraft, commercial marine, and locomotives. The 1990 base year emission inventory was updated with emission results calculated by this model.

On-road mobile sources.
On-road mobile sources of emissions consist of automobiles, trucks, motorcycles, and other motor vehicles traveling on public roadways in the nonattainment area. Combustion-related emissions are estimated for vehicle engine exhaust. Evaporative hydrocarbon emissions are estimated for the fuel tank and other evaporative leak sources on the vehicle. To calculate emissions both the rate of emissions per unit of activity (emission factors) and the number of units of activity must be determined.

Emission factors are developed using the EPA's mobile emission factor model, MOBILE (current version MOBLE6.2.03). The model allows substantial input in order to simulate the driving behavior, meteorological conditions and vehicle characteristics specific to the BPA area. Inputs used for Texas ROP on-road mobile emission inventory development are: vehicle speeds for each roadway link, vehicle age distributions for each vehicle type, percentage of miles traveled for each vehicle type, type of inspection-maintenance program, fuel control programs, and gasoline vapor pressure. Because inputs influence the emission factors calculated by the MOBILE model, every effort is made to input parameters reflecting local conditions, rather than national default values.

To estimate on-road mobile emissions, emission factors calculated by the MOBILE model described above must be multiplied by the level of vehicle activity. For on -road mobile, the emission factors are in units of grams per mile. Therefore the activity information that is required to complete the inventory calculation is vehicle miles traveled. The level of vehicle travel activity is developed using travel demand models (TDM) run by the Texas Department of Transportation or the local metropolitan planning organizations. Travel demand models are validated against a large amount of ground counts, i.e., traffic passing over counters placed in various locations throughout a county. Estimates of vehicle-miles-traveled are often calibrated to outputs from the federal Highway Performance Monitoring System, which is a model built from a smaller number of traffic counters. Roadway speeds, which are required as input for the MOBILE model, are calculated by a using the activity volumes from the TDM and a post-processor speed model.
In order to complete the ROP calculations a set of mobile inventories is required.

- The 1990 base year is the starting point for 1hour ROP. It establishes the inventory as it existed upon implementation of the 1990 CAAA.

- The adjusted base year inventories (ABY) are the basis for calculating the percent reductions as required in the ROP guidance and as a basis for determining the non-creditable reductions due to control programs implemented prior to the 1990 CAAA..
- An on-road mobile ABY inventory is required for each milestone year and for any year for which a percent reduction requirement calculation must be completed.
- The ROP analysis also requires an uncontrolled inventory with growth for each milestone year. These uncontrolled inventories serve as the basis for determining how much emission reduction is required in order to meet the ROP target. The control strategy inventories serve as the basis for calculating on-road mobile source control strategy reductions for each milestone year.
- The ROP analysis requires the calculation of a controlled inventory to subtract from the uncontrolled inventory in order to determine the effectiveness of control strategies. The ROP requires direct calculation of the control reduction which may then be subtracted from the inventory in order to determined the controlled inventory value. For BPA on-road mobile, control scenarios with and without the Texas Low Emission Diesel Program (TxLED) were calculated. Both control emission levels are presented in the on-road mobile inventory summary table, Table 2-1. The 2005 ROP demonstration for BPA did not require the use of TxLED. Therefore the ROP calculations and MVEB determinations do not include the TxLED emission reduction.

Complete documentation of the development of the on-road mobile inventories for the BPA ROP is available in Appendix 2. The complete set of input and output files are available upon request from the TCEQ's Technical Analysis Division.

A summary of the on-road mobile BPA ROP inventories is presented in Table 2-1.

Table 2-1 BPA All Counties 1990, 1996, 1999, 2002, and 2005 ROP Ozone Season Weekday On-Road Mobile Source VMT, and Emissions (tons per day)

Emissions Inventory	VMT	VOC	NOx
1990 Base Year	10,099,160	36.99	54.94
1996 Adjusted Base Year (ABY)	10,099,160	21.40	51.22
1999 ABY	10,099,160	17.96	51.19
2002 ABY	10,099,160	16.13	45.16
2005 ABY	10,099,160	14.58	36.50
1996 Pre-1990 Control (Pre90C)	11,552,473	24.29	56.54
1999 Pre-90C	12,227,610	21.51	59.95
2002 Pre-90C	12,505,133	19.51	55.36
2005 Pre-90C	12,625,135	17.82	45.12
1996 Control Strategy (CS)	11,552,473	23.95	55.47
1999 CS	12,227,610	20.52	57.17
2002 CSEI	12,505,133	17.21	49.56
2005 CSEI with TxLED	12,625,135	12.59	32.67
2005 CSEI without TxLED	12,625,135	12.59	33.97

Biogenic sources. Biogenic sources includes hydrocarbon emissions from crops, lawn grass, and forests as well as a small amount of NO_x emissions from soils. Plants are sources of VOC such as isoprene, monoterpene, and alpha-pinene. Tools for estimating emissions include satellite imaging for mapping of vegetative types, field biomass surveys, and computer modeling of emissions estimates based on emission factors by plant species using the GLOBEIS model. Emissions from biogenic sources are subtracted from the inventory prior to determining any required reductions for an ROP demonstration. However, the biogenic emissions are important in determining the overall emissions profile of an area and therefore are required for regional air quality photochemical modeling.

2.2 Updated 1990-ROP Base Year Inventory

Point sources
Updates to the point source inventory were conducted on the basis of individual companies resubmitting their EIQs in order to provide more accurate emissions information, submit recalculated emissions based on improved methodologies, or to correct mistakes discovered in their original submittals. Additional information is available upon request from the Technical Analysis Division of the TCEQ:

Area sources. The 1990 base year emissions inventory was developed in 1992. Since that time several updates in methodologies have evolved for compiling area source emissions. The EPA's Emissions Inventory Improvement Program produced approved methodologies for several area source categories, which have been implemented into the periodic inventories following 1992. These methods offered improvements

in activity data to be used as well as improved emission factors. Area source categories affected by major changes include oil and gas production, industrial coatings, consumer products, and stage I gasoline marketing. In addition, area source improvements resulted from conducting "bottom-up" surveys for some categories, including graphic arts, forest fires, and oil and gas production. These surveys produced data that more accurately depicted facility activity levels than did previous methodologies. Since these updates occurred after the 1990 base year emissions inventory was originally developed it was deemed important to update the 1990 inventory with these improvements that were based on better methodologies and surveys. See Appendix 6 for documentation of area source improvements.

Nonroad mobile sources. Since the 1990 base year emission inventory was developed in 1992 several updates in methodologies for compiling area source emissions have evolved. Categories in the model include specific equipment types associated with construction, agriculture, lawn and garden, and industry. The model also accommodates recreational boats. The model has been modified and improved to its current version and is considered significantly superior to the methods used for the original 1990 base year emissions inventory. See Appendix 7 for documentation of nonroad mobile improvements.

Three major nonroad mobile categories not included in the model are aircraft, commercial vessels, and locomotives. Since the development of the original 1990 base year inventory, methods for calculating emissions for these three categories have improved significantly. A special model was developed for generating emissions from aircraft. In addition, emissions from commercial vessels and locomotives have been updated by means of detailed surveys and studies. Since these updates occurred after the 1990 base year emissions inventory was originally developed, the 1990 inventory was updated based on new methodologies and surveys. Custom files with activity data and equipment populations are located in Appendix 4.

On-road mobile sources.
The 1990 base year emission inventory for on-road mobile sources was updated using emission factors calculated using the latest version of the MOBILE model, MOBILE6.2. The activity levels were updated to reflect the latest planning assumptions and information in BPA. Only control strategies implemented prior to 1990 are included in the base year inventory development. These controls include: Pre-90 FMVCP. The activity levels used to calculate the inventory reflect the 1990 roadway network, with 1990 vehicle miles of travel and speeds. A summary of the inventory is presented in Table 2-1. Complete documentation of the development of the inventory and the details of MOBILE6.2 inputs is available for review in Appendix 2.

Biogenic sources.
Emissions from biogenic sources are subtracted from the inventory prior to determining any required reductions for a ROP demonstration. No updated 1990 ROP base year emissions inventory is required.

2.3 Updated 1990 Adjusted Base Year Inventories for Milestone and Attainment Years 1996, 1999, 2002, 2005

The ROP planning process includes calculating the emissions baseline, the adjusted base year emission inventory, from which the ROP required percent emissions reductions are calculated. As specified by the 1990 Clean Air Act Amendments (CAAA), certain on-road mobile source emissions reductions are not creditable toward these required percentage reductions. The non-creditable reductions include the emissions reductions that would occur by the target years due to the pre-1990 CAAA state controls, pre-1990 CAAA Federal Motor Vehicle Control Program (FMVCP) and pre-1990 promulgated federal fuel volatility regulations (summertime gasoline Reid Vapor Pressure [RVP] limits beginning in 1992). Because the defeat device for HDDVs was effecting an FMVCP control that was implemented prior to the 11990 CAAA, the

HDDV NOx off-cycle emissions effects and associated mitigation program effects are also considered not creditable. For this updated HGB ROP analysis pre-1990 non-creditable emission factor reductions include:

- pre-1990 CAAA FMVCP,
- 1992 summertime RVP limit are termed pre-1990 controls, and,
- HDDV NOx off-cycle emissions and mitigation programs.

An adjusted base year emission inventory for on-road mobile sources is developed for each milestone year using emission factors from the MOBILE model that reflect only control strategies implemented prior to 1990 but projected to each milestone year. By projecting the pre-1990 FMVCP into future years the effects of additional fleet turn over due to the new standards is reflected in the emission factors. The controls included in the ABY inventory development include: Pre-90 FMVCP and the 1992 low RVP control The activity levels used to calculate the inventory reflect the 1990 roadway network, with 1990 vehicle miles of travel and speeds. The estimated non-creditable emissions reductions due to pre-1990 controls are calculated by subtracting the 1990 ABYEI relative to the target year, from the actual 1990 BYEI. Complete documentation of the development of the inventory and the details of MOBILE inputs is available for review in Appendix 2.

2.4 Updated Uncontrolled Milestone and Attainment Year Emission Inventories 1999, 2002, 2005

Overview of Methodologies and Assumptions. The uncontrolled Milestone Year Emission Inventory represents the inventory for the milestone year if no further action to control emissions was taken beyond the actions that were already in place at the enactment of the 1990 CAAA. The inventory is calculated for each major source category using methodologies approved by EPA and then combined to obtain the total uncontrolled milestone year inventory for both VOC and NOx. The uncontrolled milestone inventory includes:

- pre-1990 CAAA controls, and
- growth in activity from 1990 to the milestone year.

The uncontrolled milestone inventory does not include:

- post 1990 CAAA controls.

Point sources. The methodology utilized to obtain uncontrolled inventories is based on historical survey data. The survey that was conducted analyzed reasons for point source decreases and increases in the Emissions Inventory. The results of the survey were then used to develop a calculation methodology to derive future year uncontrolled inventories. The methodology is described in detail in Appendix U of the April 2000 Dallas-Fort Worth attainment demonstration. Using the methodologies outlined in these documents, a growth rate can be calculated for any year, area or pollutant and applied to the base year inventory.

$$EI_{FutureYear} = EI_{1990adjusted}\left(1 + \frac{GrowthRate}{100}\right)^{(futureyear-1990)}$$

Area sources. For the 1990 base year, the emissions inventory was forecast using EPA approved EGAS growth factors to develop the corresponding controlled emissions inventories for milestone and attainment years. Rule effectiveness factors for appropriate categories with TCEQ rules were applied to develop the controlled emissions.

Non-road mobile sources. Uncontrolled emission inventories are required for those nonroad mobile categories affected by specific rules impacted by ROP. Future year emission inventories had been compiled for SIP strategies prior to the inventory improvements discussed in Section 2.2. Since the future year inventories were based upon the non-updated 1990 base year inventory it was important to update these future year inventories. In addition, growth mechanisms have improved since the original future year inventories were developed. The updated uncontrolled milestone and attainment year emission inventories reflect updates in the 1990 base year inventory as well as improvements in growth technologies. In order to determine the value of the impacted rules these inventories were developed with the specific controls for these rules removed. NONROAD model uncontrolled files may be found in Appendix 5.

On-road mobile sources.
The milestone year uncontrolled emission inventory for on-road mobile sources is developed using emission factors from the MOBILE model that reflect only control strategies implemented prior to 1990. These controls include: Pre-90 FMVCP and the 1992 RVP control. The activity levels used to calculate the inventory reflect the milestone roadway network, with milestone year vehicle miles of travel and speeds. The inventories used for this BPA SIP update include updates to both the emission factor development, the latest version of MOBILE, MOBILE 6.2 was used, and updates to the activity levels to include the latest planning assumptions for BPA. A summary of the inventories is presented in Table 2-1. Complete documentation of the development of the inventory and the details of MOBILE inputs is available for review in Appendix 2.

Biogenic sources.
Emissions from biogenic sources are subtracted from the inventory prior to determining any required reductions for a ROP demonstration. No uncontrolled milestone and attainment year emission inventories for 1999, 2002, and 2005 are required.

2.5 Updated Controlled Milestone Year Emission Inventories 1999, 2002, 2005

Overview of Methodologies and Assumptions. The Controlled Milestone Year Emission Inventory represents the inventory for the milestone year with growth from the 1990 base year and with all ROP controls taken into account. The inventory is calculated for each major source category using methodologies approved by EPA and then combined to obtain the total controlled milestone year inventory for both VOC and NOx. The controlled milestone inventory includes:

- pre-1990 CAAA controls,
- growth in activity from 1990 to the milestone year, and,
- post 1990 CAAA controls that are used to meet the ROP target level of emissions.

The uncontrolled milestone inventory does not include:

- post 1990 CAAA controls that are not used to meet the ROP target level of emissions.

Point sources. Point source control strategies developed as part of the BPA ROP are taken into account in the updated controlled year emissions inventories. See Section 4.2 for a discussion of the specific controls and reductions in effect for each of the milestone years.

Area sources. Future year area source emission inventories had previously been compiled for SIP strategies. However, these inventories were developed prior to the inventory improvements discussed in Section 2.2 and were grown from the original 1990 base year inventory using EPA approved growth factors. Since the future year inventories were based upon the non-updated 1990 base year inventory it was important to update these

future year inventories. In addition, growth mechanisms have improved since the original future year inventories were developed. The updated controlled milestone and attainment year emission inventories reflect updates in the 1990 base year inventory as well as improvements in growth technologies.

On-road mobile sources.
The milestone year controlled emission inventory for on-road mobile sources is developed using emission factors from the MOBILE model that reflect both control strategies implemented prior to 1990 and the control strategies used to demonstrate compliance with the rate-of-progress requirements. These controls include: Pre-90 FMVCP, Post-1990 FMVCP and Texas LED. Control scenarios with and without the Texas LED benefit were developed for use in BPA ROP preliminary analysis. The Texas LED program is not required to meet the ROP demonstration requirements. Therefore the no TxLED control scenario is used for all final ROP and ROP MVEB calculations. The activity levels used to calculate the inventory reflect the milestone roadway network, with milestone year vehicle miles of travel and speeds. The controlled inventories used for this ROP SIP update include using the latest EPA emission factor model, MOBILE6.2, and updates to the activity levels to reflect the latest transportation planning assumptions. Complete documentation of the development of the inventory and the details of MOBILE inputs is available for review in Appendix 2.

Nonroad mobile sources. Controlled emission inventories are required for those nonroad mobile categories affected by specific rules impacted by ROP in order to show the impact of the emission reductions resulting from specific rules. For the same reasons denoted in section 2.2 concerning updates in methodologies and growth technologies updated controlled milestone and attainment year emission inventories were compiled for the ROP strategies. NONROAD model controlled files may be found in Appendix 3.

Biogenic sources.
Emissions from biogenic sources are subtracted from the inventory prior to determining any required reductions for a ROP demonstration. No updated controlled milestone year emission inventories for 1999, 2002, and 2005 are required.

CHAPTER 3: TARGET EMISSION LEVELS

3.1 Target Level Methodologies

Target level emissions are the maximum amount of emissions a nonattainment area can emit for a given target year while complying with the 3 percent per year reduction requirements and the 15 percent VOC requirement. Post-1996 target level years in this ROP demonstration for the Beaumont–Port Arthur nonattainment are 1999, 2002 and 2005.

The FCAA Amendments of 1990 mandate each serious and above ozone nonattainment area demonstrate actual VOC emission reductions of at least 3 percent per year averaged over each consecutive 3-year period beginning in 1996, until the area's nonattainment date. The FCAA Amendments of 1990 also require a 15 percent VOC emission reduction, net of growth between 1990 and 1996. These milestone emission reductions (the post-1996 ROP demonstration) are demonstrated by calculating the target levels of emissions, projected emissions growth, and emission reduction levels for each milestone and attainment date. This chapter describes how this post-1999 ROP demonstration for the BPA is calculated.

3.1.a Calculation of the VOC Emission Target Levels for the Post-1996 Target Levels. Six steps were used in calculating each post-1996 target level of emissions (see Appendix 1, Tables 4-1 through 7-3):

- Steps 1 and 2 Appendix 1, Tables 4-1 and 4-2, developing the 1990 base year inventory and the 1990 ROP inventory, were also required in the 15 percent ROP demonstration but were updated here to incorporate new emission methodologies, such as the MOBILE6 emission factor model;

- Step 3 Appendix 1, Table 4-3 recalculates each adjusted base year inventory due to fleet turn over (mobile source emissions are recalculated with the MOBILE6 model due to non-creditable pre-1990 RVP/FMVCP controls);

- Step 4, Appendix 1, Table 4-4, calculates the amount of non-creditable FMVCP/RVP reductions by taking the difference between each milestone/attainment year's mobile source emissions and the mobile source emissions of the 1990 base year inventory. The fleet turnover correction factors are calculated by taking the difference between the FMVCP/RVP reductions; and

- Steps 5 and 6, Appendix 1, Table 4-5, the 3 percent per year and the 15 percent reductions are calculated. The 15 percent reduction, which is required by 1996, is calculated first. Then the 3 percent per year reduction for the following milestone years are calculated as required by §182(c)(2)(c)) of the FCAA Amendments of 1990, which allow for the substitution of actual NO_x emission reductions to meet the 3 percent per year VOC emissions target level requirements. Appendix 1, Tables 4-6 and 4-7, demonstrates the combination of VOC and NO_x emission reductions that totals 3 percent per year to satisfy this criteria.

The following equation generally describes the method to calculate the percentage of NO_x emissions substituted for VOC emissions:

$$N = [0.03 * (X-Y)] - V$$

where:

V = percentage VOC Reduction

X = previous milestone date
Y = milestone/attainment date
N = percentage NO_x reductions

For this BPA SIP update, NOx reductions were substituted for the entire 3 percent a year requirement. A summary of the percent reductions for VOC and NOx is shown in Table 3-1.

Table 3-1 Summary of VOC and NOx Percent Reduction for BPA ROP SIP Update

BPA ROP Milestone Year	Percent VOC Reduction	Percent NOx Reduction
1996	15	N/A
1999	7	2
2002	0	9
2005	0	9

Next, these percentages are multiplied by the adjusted base year inventories calculated relative to the each milestone/attainment date to yield the required VOC and NO_x emission reductions as generally described in the following equation:

RQvoc = BEx * V

and

$RQno_x$ = BEx * N

where:

RQvoc = required VOC emission reductions
$RQno_x$ = required NOx emission reductions
BEx = adjusted base year inventory

In order to use NO_x substitution, separate target levels of emissions need to be calculated for both NO_x and VOC emission reductions. The target levels are calculated in Appendix 1, Table 7.1 for NO_x and VOC respectively. It is important to note that in Appendix 1, Tables 4-6 and 4-7, the 1999 target level of VOC emissions is calculated by combining the required 15 percent VOC reduction for 1996 with the VOC portion of the 9 percent total VOC and/or NOx reductions required for 1999. This results in a total VOC and NOx emission reductions of 24 percent by 1999, including 15 percent VOC required for the 1999 target level.

The calculation of the target levels of emissions for each post-1996 milestone year can be generalized into the following equation:

Target level = (previous milestone's target level) - (reductions required to meet the rate-of-progress requirement) - (fleet turnover correction term).
or
TLx = TLy - BGx - FTx

where:

TLx = Target level of emissions for current milestone
TLy= Target level of emissions for previous milestone
BGx= Emission reduction requirement for current milestone
FTx = Fleet turnover correction term for current milestone

The area's plan must demonstrate that the projected emissions for each milestone/attainment year, reflecting the adopted control strategy, will be less than or equal to the calculated target values calculated in Appendix 1, Tables 4-6 and 4-7. The following paragraphs describe these methods and the calculations required for this portion of the ROP demonstration.

3.1.b Growth. As previously stated, the FCAA Amendments of 1990 require all ozone nonattainment areas classified as moderate and above to achieve a 15 percent reduction in actual VOC emissions by 1996. The FCAAA also require emissions be reduced by 3 percent every year until the attainment date. The reductions are calculated from the anthropogenic VOC and NO_x emission levels reported in the state's 1990 base year inventory after those levels have been adjusted for pre-1990 controls as described in Section 2.3. This section presents the projection or forecast year emission inventories, i.e., the state's estimation of the level of VOC and NO_x emissions to be expected if no further action is taken to control VOC or NO_x emissions. The VOC and NO_x projected year emission inventories are derived by applying the appropriate growth factors to the 1990 base year emission inventories as described in Section 2.4.

Emission projections are calculated in Appendix 1, Tables 5-1, 5-2 and 5-3. Totals for NO_x and VOC are calculated for each milestone/attainment year for which ROP attainment demonstration is required in this SIP. The target levels calculated in Appendix 1, Table 4-6 and 4-7, are subtracted from these emission forecasts to calculate the required emission reductions necessary for each milestone/attainment year.

3.1.c ROP demonstration. The target levels calculated in Appendix 1, Table 7-1, are subtracted from the emissions forecasts, Appendix 1, Table 7-2, to calculate the required emission reductions necessary for each milestone/attainment year. The creditable reductions achieved are then subtracted from the required reductions calculated (Appendix 1, Table 7-2). The FCAA Amendments of 1990 require the state to adopt specific contingency measures that will take effect without further action by the state or the EPA if the state fails to reduce VOC and/or NO_x emissions by an additional 3 percent per year from 1997 through 2005. Contingency measures are further discussed in section Appendix 1, Table7-1.

3.2 ROP Demonstration for 1999 (24 percent), ROP Demonstration for 2002 (9 percent) and ROP Demonstration for 2005 (9 percent)

The rate-of -progress plan requires the control strategy plan to demonstrate emission reductions that will reduce the future emission inventories to a value less than the emissions target value. Table 3-2 summarizes the demonstration of the rate-of-progress plan for BPA for the post-1996 ROP milestone years of 1999, 2002, 2005.

Table 3-2 Summary of Rate of Progress Demonstration

Description	1999		2002		2005	
	NOx	VOC	NOx	VOC	NOx	VOC
Uncontrolled Emissions Forecast	316.79	311.99	310.50	316.06	301.09	313.99
Target level of emissions	303.37	230.40	270.02	228.57	234.82	227.02
Required Reductions	13.42	81.59	40.48	87.49	66.27	86.97
Control Reductions						
Point Source: Federal, State, Local Point Source Controls (Appendix 1 - Sheet 13)	87.67	159.27	108.78	184.37	109.22	183.66
On-road mobile: Post 1990 CAAA FMVCP (Tier I/II, HDDV)	2.78	0.99	5.80	2.30	11.15	5.23
Non-road mobile: Gasoline utility engine rule, marine recreation & HDDV standards (Appendix 1 - Sheet 14)	1.13	1.71	2.27	3.17	3.62	5.55
Area Source: All area source control strategies are used as contingency measures in the ROP demonstration, therefore the reduction values are set to zero for the ROP milestone demonstration (see Appendix 1-Sheet 12 for details)	0.00	0.00	0.00	0.00	0.00	0.00
Controlled Emissions forecast	225.21	150.02	193.65	126.22	177.10	119.55
Is controlled emission forecast less than target level of emissions?	Yes	Yes	Yes	Yes	Yes	Yes

CHAPTER 4: CONTROL MEASURES TO ACHIEVE TARGET EMISSION LEVELS

4.1 Overview of Control Measures

This section briefly describes how control measures were used to account for the emission reductions required to meet the ROP requirements for the 1999, 2002, and 2005 BPA attainment milestones. Chosen creditable control measures and methodologies employed to estimate achieved emission levels are further described in Sections 4.2 through 4.6. The projected emissions reflect federal and state emission controls. All state control measures are codified in Texas state regulations. The summary of emission reductions expected from the control measures used to meet the milestone reduction requirements is presented in Table 4-1. Total NOx and VOC emission reductions for each milestone/attainment date are listed for each control measure and totals are summed.

Table 4-1 Summary of Emission Reductions

Description	1999		2002		2005	
	NOx	VOC	NOx	VOC	NOx	VOC
Point Source: Federal, State, Local Point Source Controls (Appendix 1-Sheet 13 for details of point source controls)	87.67	159.27	108.78	184.37	109.22	183.66
On-road mobile: Post-1990 CAAA FMVCP	2.78	0.99	5.80	2.30	11.15	5.23
Non-road mobile: gasoline utility engine rule, marine recreation & HDDV standards (Appendix 1, Sheet 14 documents the details of the nonroad control reductions)	1.13	1.71	2.27	3.17	3.62	5.55
Area Source: All area source control strategies are used as contingency measures in the ROP demonstration, therefore the reduction values are set to zero for the ROP milestone demonstration (see Appendix 1-Sheet 12 for details)	0.00	0.00	0.00	0.00	0.00	0.00
Total Reductions	91.58	161.97	116.85	189.84	123.99	194.44

4.2 Point-Source Controls

NO_x point source controls for BPA have been adopted and implemented in stages, beginning with the initial NO_x RACT rules that have a compliance deadline of November 15, 1999. A subsequent adoption extended RACT requirements to lean-burn engines, with a compliance date of November 15, 2001. The final round of NO_x rules specified emission specifications for the attainment demonstration, with two-thirds of the reductions due by May 1, 2003, and the remaining one-third of the reductions by May 1, 2005. A summary of the affected sources and compliance dates is provided in Table 4-2. See Appendix 1 Sheet 13 for the rule effectiveness adjusted, actual inventory data upon which the sum total of emissions reductions for point source controls are based, for calendar years up through 2002.

Table 4-2 Point Source Controls

Control Strategy Description	Compliance date
NO_x RACT rules:	11/15/99 (except lean-burn engines)
Electric utility boilers	
Industrial boilers	
Industrial process heaters	
Gas turbines	
Rich-burn engines	
Lean-burn engines	
Attainment demonstration NO_x rules:	11/15/01
Electric utility boilers	
Industrial boilers	2/3 reductions by 5/1/03
Industrial process heaters	Remaining 1/3 reduction by 5/1/05
Gas turbines	

4.3 Area-Source Controls

For the 1990 Base Year, the emissions inventory was forecast using EPA approved EGAS growth factors to develop the corresponding controlled emissions inventories for milestone and attainment years. Rule effectiveness factors for appropriate categories with TCEQ rules were applied to develop the controlled emissions.

Table 4-3 Summary of Area Source Emissions

Beaumont/Port Arthur (Tons/Day)	1990		1999		2002		2005	
	NOx	VOC	NOx	VOC	NOx	VOC	NOx	VOC
Uncontrolled Emissions Estimates	16.73	25.05	10.86	31.48	7.09	37.32	6.40	36.69
Controlled Emissions Estimates	16.73	24.56	10.86	23.15	7.09	27.44	6.40	26.98
Total Reductions	0.00	0.49	0.00	8.33	0.00	9.88	0.00	9.71

4.4 Non-road Mobile Source Controls

Most non-road mobile equipment emissions were calculated using the EPA NONROAD2002 Model. The NONROAD2002 Model comes with a set of default files that are required for calculating non-road mobile emissions. The TCEQ has customized several of the data files that are read by the NONROAD Model to more accurately reflect the emissions generated by non-road mobile equipment in Texas. The remaining non-road mobile equipment, comprised of locomotives, aircraft and its support equipment, and commercial marine vessels, was calculated outside of the NONROAD2002 Model using EPA approved methodologies.

For the Rate of Progress Plan (ROP), the model was executed using custom population and activity files. In some cases, custom allocation and technology type data files were also used. The technology type file is of most interest for the ROP because it identifies what percent of an equipment population is expected to utilize federal non-road equipment controls for the year of interest.

For the baseline model runs, the technology type file was altered so that no controls phased-in past the year 1990 were applied. That is to say to represent what the emissions would be if no new controls were implemented since the year 1990.

The default technology type file was then used to calculate controlled emissions for each year of interest. The default file defines federal controls distributed by year for non-road equipment.

Once the uncontrolled and controlled emissions estimates have been generated by the NONROAD2002 Model, the effectiveness of control strategies for each year of interest can be evaluated. Emissions reductions from federal controls on non-road equipment can be calculated by subtracting the controlled emissions estimates from the uncontrolled emissions estimates.

For each run that the NONROAD2002 Model executes, it generates a message file that documents all of the input data files and input parameters used for each run. Message files for each of the runs used to evaluate the ROP may be found in Appendix 3 and Appendix 4. Documentation for the custom data files used in the ROP model runs may be found in Appendix 5. More information on technology types may be found in the technical documentation for the Nonroad Model.

Locomotive emissions were calculated on spreadsheets using track mileage and engine fuel data provided by individual railroad lines. Aircraft emissions were calculated using the EPA approved Emissions and Dispersion Model System (EDMS) model. And commercial marine vessel emissions were developed from an intensive study of actual vessel activity.

The summary of uncontrolled and controlled emissions estimates for the BPA area and the for all nonroad mobile equipment may be found below in Table 4-4. Details of the nonroad control strategy emission reductions are documented in Appendix 1 - Sheet 14.

Table 4-4 Summary of Nonroad Mobile Emissions

Beaumont/Port Arthur (Tons/Day)	1990		1999		2002		2005	
	NOx	VOC	NOx	VOC	NOx	VOC	NOx	VOC
Uncontrolled Emissions Estimates	20.63	13.47	26.47	15.00	29.04	15.74	31.05	16.51
Controlled Emissions Estimates	20.63	13.47	25.34	13.29	26.77	12.57	27.43	10.96
Total Reductions	0	0	1.13	1.71	2.27	3.17	3.62	5.55

4.5 On-road-Mobile Source Control

The projected mobile source emissions inventories documented in Appendix 2 reflect all federal and state mobile source control rules required to demonstrate ROP for 1999, 2002 and 2005 for the 3-county BPA. The on-road mobile controls used to demonstrate ROP include: the Federal Motor Vehicle Control Program; and low emission diesel fuel. See Appendix 2 for a complete discussion of mobile source modeling and the control programs included in the inventory development. Table 4-5 summarizes the on-road mobile controls modeled for each milestone year.

Table 4-5 Control Programs Modeled in MOBILE6 Emissions Factors For 1990, 1999, 2002, and 2005 ROP Controlled Emissions Inventories

Milestone Year	Controls Modeled
1990 Base Year	Pre-90 FMVCP (estimated actual RVP applied).
1999 Control Strategy	Pre-90 FMVCP, Post-1990 FMVCP
2002 Control Strategy	Pre-90 FMVCP, Post-1990 FMVCP
2005 Control Strategy	Pre-90 FMVCP, Post-1990 FMVCP

4.6 Contingency Measures

In case of a milestone failure, the state is required to have contingency control measures that achieve an additional 3 percent reduction between the milestone year and the next calendar year. For the BPA area the contingency plan includes the use of point, nonroad and onroad mobile source control programs. A summary of the estimated control reduction and the required contingency level of reductions is presented in Table 4-6. This contingency plan meets the reduction requirements for all years.

The onroad mobile source contingency reductions were calculated by developing an emission factor ratio between the ROP milestone year and the ROP contingency year and multiplying the ratio by the milestone year emission inventory. The MOBILE model was used to develop the emission factors. The only difference in the MOBILE input between the milestone inventory development and the contingency year ratio development is the model evaluation year. This allows for a projection of the fleet turn over effect for a one year period. The detailed MOBILE inputs are documented in Appendix 2. The specific MOBILE input and output files for the contingency calculations are available form TCEQ upon request.

The nonroad mobile contingency estimates were calculated by assuming a linear reduction line between ROP milestone years. Using the linear reduction assumption, the nonroad inventories from the two inventory years closest to the contingency year were used to determine a one year emission reduction due to nonroad controls accounted for in the NONROAD Model. Details of the NONROAD Model inputs and inventory development are available in Appendices 3, 4 and 5.

Table 4-6 ROP Contingency Demonstration for BPA

Description	2000		2003		2006	
	NOx	VOC	NOx	VOC	NOx	VOC
Adjusted Base Year for Previous Milestone	309.56	301.53	303.53	299.70	294.87	298.15
Percent for Contingency	0.82	2.18	0.82	2.18	1.79	1.21
Required Contingency Reduction	2.54	6.57	2.49	6.53	5.28	3.61
Control Reductions to Meet Contingency						
On-road mobile: Post 1990 CAAA FMVCP	2.21	1.18	2.05	0.56	4.09	1.22
Non-road mobile: Gasoline utility engine rule, marine recreation & HDDV standards	0.38	0.57	0.76	1.62	1.21	1.85
Area Source: (details of the individual area source control program reductions are documented in Appendix 1 - Sheet 12)	0.00	4.82	0.00	4.35	0.00	0.54
Total Contingency Reduction	2.59	6.57	2.81	6.53	5.30	3.61
Is contingency reduction greater than or equal to the required contingency reduction?	Yes	Yes	Yes	Yes	Yes	Yes

CHAPTER 5: MOTOR VEHICLE EMISSIONS BUDGETS

5.1 Overview of Methodologies and Assumptions

Because ROP demonstrations are control strategy SIP revisions, they establish motor vehicle emission budgets, which set caps on emissions. Projected emissions from transportation plans and programs must be equal to or less than these caps, under the federal transportation conformity rule.

5.2 Motor Vehicle Emissions Budgets for Milestone Years 1999, 2002, 2005

EPA requires all ROP and attainment demonstration SIPs to establish MVEBs for transportation conformity purposes. If the commission adopts additional control measures to reduce on-road motor vehicle emissions as a SIP revision, the commission will concurrently revise the motor vehicle emissions budget(s) for the SIP and submit such revised budget(s) to EPA as a revision to the SIP. With regard to on-road mobile source control measures, the state understands from EPA that only technology-related measures, such as I/M, cleaner fuels, and use restrictions/incentives may be included. Measures that could limit future highway construction, such as growth restrictions, may not be included.

A motor vehicle emission budget is the on-road mobile source allocation of the total allowable emissions for each applicable criteria pollutant or precursor, as defined in the SIP. Transportation conformity determinations must be performed using the budget test, once EPA determines the budget(s) adequate for transportation conformity purposes. In order to pass the budget test, areas must demonstrate that the estimated emissions from transportation plans, programs and projects do not exceed the motor vehicle emissions budget(s).

The ROP motor vehicle emissions budgets for the 3-county BPA ozone nonattainment area are listed in the Tables 5-1, 5-2, and 5-3. The ROP budgets in these three tables represent the 1999, 2002 and 2005 projected on-road mobile source VOC and NO_x emissions that demonstrate post-1996 rate-of-progress.

Table 5-1 1999 ROP Motor Vehicle Emission Budgets for BPA

Description	NO_x tons per day	VOC tons per day
1999 On-road Emissions Projection Without Post-1990 CAAA Controls	59.95	21.51
1999 On-road Mobile Rate-of-Progress Controls: Post 1990 CAAA FMVCP	2.78	0.99
1999 ROP MVEB (uncontrolled inventory minus controls)	57.17	20.52

Table 5-2 2002 ROP Motor Vehicle Emission Budgets for BPA

Description	NO_x tons per day	VOC tons per day
2002 On-road Emissions Projection Without Post-1990 CAAA Controls	55.36	19.51
2002 On-road Mobile Rate-of-Progress Controls: Post 1990 CAAA FMVCP	5.8	2.3
2002 ROP MVEB (uncontrolled inventory minus controls)	49.56	17.21

Table 5-3 2005 ROP Motor Vehicle Emission Budgets for BPA

Description	NO_x tons per day	VOC tons per day
2005 On-road Emissions Projection Without Post-1990 CAAA Controls (Appendix 2)	45.12	17.82
2005 On-road Mobile Rate-of-Progress Controls: Post 1990 CAAA FMVCP TxLED	12.45	5.23
TxLED	1.30	0.00
2005 ROP MVEB (uncontrolled inventory minus all controls, plus TxLED benefit)	33.97	12.59

GLOSSARY

This section provides the specific definitions of terms that are used in this ROP SIP document. The following definitions are presented for the purposes of reading and understanding the information provided in this document only.

Activity Level /Factor is a measurable factor that is directly or indirectly related to the emissions of a process. An emission estimate is calculated by multiplying an activity level by an emission factor. The activity level is either directly related to the amount of emissions (as in the case of the amount of fuel used in combustion process), or is a more easily measured surrogate, such as population for consumer product usage.

Anthropogenic Emissions Pollutants emitted from sources for which the activity of the source derives from human activities.

Area Sources are smaller sources that do not qualify as point sources under the relevant emissions cutoffs. Area sources encompass more widespread sources that may be abundant, but that, individually, release small amounts of a given pollutant. Examples typically include dry cleaners, residential wood heating, auto body painting, and consumer solvent use.

Attainment Year. The year that a nonattainment area is required to demonstrate attainment of the ozone NAAQS.

Basic Inspection and Maintenance (I/M) Programs requiring the inspection of vehicles including, but not limited to, measurement of tailpipe emissions, and mandating that vehicles with tailpipe emissions higher than the program cutpoints be repaired to pass a tailpipe emissions retest. Basic I/M programs must be at least as stringent as the requirements set out in FCAAA of 1990, Section 182(a)(2)(B).

Biogenic Emissions Biogenic emissions are defined as all pollutants emitted from non-anthropogenic sources. Example sources include trees and vegetation, oil and gas seeps, and microbial activity. While fermentation produces biogenic emissions, gases from this process are included under either point or area sources.

Controlled Indicates that the effects of a specified set of control strategies is included in an emission inventory value.

Control Technology; Control Measures Equipment, processes or actions used to reduce air pollution. The extent of pollution reduction varies among technologies and measures. In general, control technologies and measures that do the best job of reducing pollution will be required in the areas with the worst pollution. For example, the best available control technology/best available control measures (BACT, BACM) will be required in serious nonattainment areas for particulates, a criteria air pollutant. A similar high level of pollution reduction will be achieved with maximum achievable control technology (MACT) which will be required for sources releasing hazardous air pollutants.

Economic Growth Analysis System (E-GAS) An EPA model for projecting emissions growth based on value-added and physical output data.

Emission Release of pollutants into the air from a source.

Emission Factors are ratios that relate emissions of a pollutant to an activity level at a plant that can be easily measured, such as an amount of material processes, or an amount of fuel used. Given an emission factor and a known activity level, a simple multiplication yields an estimate of the emissions. Emission factors are developed from separate facilities within an industry category, so they represent typical values for an industry, but do not necessarily represent a specific source.

Emission Inventory: Emission inventories are quantities of pollutants measured over time. Emission inventories can be developed with different control strategies scenarios to determine the effectiveness of the control strategies in meeting regulatory requirements. The ROP inventories are developed for an ozone season weekday. The temperatures, fuels, controls and controls represent ozone season values. The activity levels represent weekday, average for Monday through Friday.

Emission Standards Rules and regulations that set limits on how much pollution can be emitted from a given source. The most straightforward emissions standard is a simple limitation on mass of pollutant per unit time (e.g., pounds of pollutant per hour).Vehicle and equipment manufacturers have responded to many mobile source emission standards by redesigning vehicles and engines to reduce pollution.

Federal Motor Vehicle Control Program (FMVCP) All federal actions aimed at controlling pollution from motor vehicles by such efforts as establishing and enforcing tailpipe and evaporative emission standards for new vehicles, testing methods development, and guidance to states operating inspection and maintenance programs.

Fleet Turnover Correction An adjustment made to the adjusted base year inventory in calculating the target level of emissions. This adjustment is computed for each milestone and attainment year to reflect the emission reductions associated with the pre-1990 FMVCP and RVP program as defined in 55 FR 23666, June 11, 1990.

Milestone Compliance Demonstration For serious and above classified nonattainment areas, demonstrating achievement of the 15 percent VOC emissions reduction over the 1990-1996 period, or demonstrating subsequent 3 percent VOC emissions reductions per year averaged over each consecutive 3-year period from November 15, 1996 until the attainment date. Section 182(g)(2) requires that within 90 days of the date on which an applicable milestone occurs (not including an attainment date on which a milestone occurs in cases where the standard has been attained), States with nonattainment areas must submit a demonstration that the milestone has been met.

Milestone Year. The third year of each consecutive 3-year period from November 15, 1996 until the attainment date in an ozone nonattainment area is termed a milestone year. The area is required to demonstrate a 3 percent per year VOC/NOx emission reduction averaged over the three year period for each milestone year.

MOBILE6.2 MOBILE is an EPA model for estimating pollution from highway vehicles. MOBILE calculates emissions of hydrocarbons (HC), oxides of nitrogen (NOx), and carbon monoxide (CO) from passenger cars, motorcycles, light- and heavy-duty trucks. The model accounts for the emission impacts of factors such as changes in vehicle emission standards, changes in vehicle populations and activity, and variation in local conditions such as temperature, humidity and fuel quality. MOBILE is used to calculate

current and future emission inventories of these emissions at the national and local level. These inventories are used to make decisions about air pollution policy at the local, state and national level. Inventories based on MOBILE are also used to meet the federal Clean Air Act's State Implementation Plan (SIP) and transportation conformity requirements.

Mobile Sources Motor vehicles, engines, and equipment that move, or can be moved, from place to place. Mobile sources include vehicles that operate on roads and highways ("onroad" or "highway" vehicles), as well as nonroad vehicles, engines, and equipment. Examples of mobile sources are cars, trucks, buses, motorcycles, earth-moving equipment, lawn and garden power tools, ships, railroad locomotives, and airplanes.

Motor Vehicle Emissions Budget A motor vehicle emission budget is the on-road mobile source allocation of the total allowable emissions for each applicable criteria pollutant or precursor, as defined in the SIP.

1990 Adjusted Base Year Inventory FCAAA of 1990, Section 182(b)(1)(B) and (D) describe the inventory (hereafter referred to as the adjusted base year inventory) from which moderate and above ozone nonattainment areas must achieve a 15 percent reduction in VOC emissions by 1996. This inventory is equal to "the total amount of actual VOC or NO_x emissions from all anthropogenic (man-made) sources in the area during the calendar year of enactment," excluding the emissions that would be eliminated by FMVCP regulations promulgated by January 1, 1990, and RVP regulations (55 FR 23666, June 11, 1990), which require specific maximum RVP levels for gasoline in particular nonattainment areas during the peak ozone season. The 1990 rate-of-progress base year inventory (defined below) removes biogenic emissions and emissions from sources listed in the base year inventory that are located outside of the nonattainment area. The adjusted base year inventory removes the emissions reductions from the FMVCP and RVP program from the 1990 rate-of-progress base year inventory. The adjusted base year inventory, which is due by November 15, 1992, is used to calculate the required 15 percent reductions.

Adjusted Base Year Emissions Inventory = Base Year Emissions Inventory, minus the following:

- Biogenic source emissions.
- Emissions from sources outside of the nonattainment area boundary.
- Emissions reductions from the FMVCP.
- Emissions reductions from the RVP rules

1990 Base Year Inventory An accounting of all anthropogenic VOC, CO, and NO_x emissions in the nonattainment area. This emissions inventory is calculated by removing biogenic emissions and the emissions from sources that are located outside of the nonattainment area from the base year inventory. This inventory is used in developing the adjusted base year inventory. It is also used as the basis from which to calculate the 1996 target level of emissions.

1996 Target Level of Emissions The 1996 target level of emissions is the maximum amount of ozone season VOC emissions that can been emitted by an ozone nonattainment area in 1996 for that nonattainment area to be in compliance with the 15 percent rate-of-progress requirements. It is calculated by first taking 15 percent of the adjusted base year inventory emissions. This emissions value is then added to the expected emissions reductions due to the FMVCP and RVP program, and from corrections to any deficient RACT rules and I/M programs. The summation of the 15 percent, the expected reductions from deficient I/M and RACT programs, and reductions from the FMVCP and RVP program are then subtracted from the 1990 rate-

of-progress base year inventory to arrive at the 1996 target level of emissions. This target is used by States to design their 15 percent VOC emissions reduction control strategies. The projected control strategy inventory used in the rate-of-progress plan must be at or below the 1996 target level of emissions to demonstrate that the 15 percent VOC emissions reduction will be accomplished.

Target Level of Emissions = Rate-of-Progress Base Year Inventory, minus the following:

- 15 percent of the 1996 adjusted base year inventory emissions.
- 3 percent a year of the post-1996 adjusted base year inventory emissions.
- Emissions reductions from corrections to any deficient RACT rules.
- Emissions reductions from corrections to deficient I/M programs.
- Emissions reductions from the pre-1990 FMVCP.
- Emissions reductions from RVP rules.

Nitrogen Oxides (NOx):A group of highly reactive gases that contain nitrogen and oxygen in varying amounts. Many of the nitrogen oxides are colorless and odorless. The common pollutant nitrogen dioxide (NO2) can often be seen combined with particles in the air as a reddish-brown layer over many urban areas. Nitrogen oxides are formed when the oxygen and nitrogen in the air react with each other during combustion. The formation of nitrogen oxides is favored by high temperatures and excess oxygen (more than is needed to burn the fuel). The primary sources of nitrogen oxides are motor vehicles, electric utilities, and other industrial, commercial, and residential sources that burn fuels.

Nonattainment Area A geographic area in which the level of a *criteria air pollutant* is higher than the level allowed by the federal standards. A single geographic area may have acceptable levels of one criteria air pollutant but unacceptable levels of one or more other criteria air pollutants; thus, an area can be both attainment and nonattainment at the same time. It has been estimated that 60 percent of Americans live in nonattainment areas.

NONROAD Model: The NONROAD model is an EPA tool used to determine emissions of exhaust, diurnal, and refueling hydrocarbons (HC), carbon monoxide (CO), oxides of nitrogen (NOx), sulfur oxides (SOx), exhaust particulate matter (PM), carbon dioxide (CO2), as well as volume of fuel consumed by all types of non-road mobile equipment except locomotives, aircraft, and commercial marine vessels. The level of detail from the model includes fuel type (diesel, gasoline, LPG, and CNG), individual Source Category Classification (SCC), power range, geographic area (nationwide, state, or county), and temporal (annual, seasonal, monthly, weekday/weekend) for calendar years 1970 to 2050. During the model development process a number of model versions have been released for public comment and used in EPA rulemaking inventory estimates. The current version of NONROAD is NONROAD2002, released in December 2002. NONROAD2002 was used to develop the ROP inventories used in this SIP.

Offset Ratios For the purpose of satisfying the emissions offset reduction requirements of section 173(a)(1)(A), the emissions offset ratio is defined as the ratio of total actual emissions reductions of VOC (and NO_x unless exempted under FCAAA of 1990, Section 182 (f)obtained as offsets from existing sources to total allowable emissions increases of such pollutant from the new source.

Ozone A gaseous molecule that contains three oxygen atoms (O3). Ozone can exist either high in the atmosphere, where it shields the Earth against harmful ultraviolet rays from the sun, or close to the ground, where it is the main component of smog. Ground-level ozone is a product of reactions involving

hydrocarbons and nitrogen oxides in the presence of sunlight. Ozone is a potent irritant that causes lung damage and a variety of respiratory problems.

Peak Ozone Season The contiguous 3-month period of the year during which the highest ozone exceedance days have occurred over the 3 to 4 years prior to the 1990 base year. Most ozone nonattainment areas have a peak ozone season lasting from June through August. The peak ozone season is used to determine the temperatures that are appropriate for developing emission inventories for ROP analyses.

Point Source Any stationary source that has the potential to emit more than a specified threshold level of a pollutant or is identified as an individual source in a State's emissions inventory. For base year SIP inventory purposes, point sources are defined as sources emitting 10 tpy or more of VOC emissions or 100 tpy or more of NO_x or CO emissions.

Post-1996 Rate-of-Progress Plan The portion of the SIP revision due by November 15, 1994, which describes how serious and above areas plan to achieve the post-1996, 3 percent per year VOC emissions reductions averaged over each consecutive 3-year period from November 15, 1996 until the attainment date. This SIP revision also includes the attainment demonstration for moderate interstate nonattainment areas and serious and above nonattainment areas.

Projected Milestone Inventory An inventory of projected emissions that includes the effect of future control measures. A nonattainment area computes this inventory in its post-1996 rate-of-progress plan for each target year.

Reasonably Available Control Technology (RACT) Control technology that is reasonably available, and both technologically and economically feasible. Usually applied to existing sources in nonattainment areas; in most cases is less stringent than new source performance standards.

Reformulated Gasoline -- specially refined gasoline that when combusted produces specified reductions in the amounts of VOCs and NOx relative to a standard gasoline. The 1990 FCAAA requires sale of reformulated gasoline in nine areas, including HGB. The Act also specified that RFG contain oxygen - 2 percent by weight. MTBE (methyl tertiary butyl ether) and ethanol are the two most commonly used substances that add oxygen to gasoline. Oil companies decide which substance to use to meet the law's requirements.

Rule Effectiveness (RE) For stationary sources, a measure of the extent to which a regulatory program achieves emissions reductions. An RE of 100 percent reflects a regulatory program achieving all the emissions reductions that could be achieved by full compliance with the applicable regulations at all sources at all times. However, regulations typically are not 100 percent effective due to limitations of control techniques or shortcomings in the implementation and enforcement process. The EPA allows the use of three different methods for determining RE: an 80 percent default value; results from EPA Questionnaires; or results from a Stationary Source Compliance Division (SSCD) study.

State Implementation Plan (SIP) A detailed description of the programs a state will use to carry out its responsibilities under the Federal Clean Air Act. State implementation plans are collections of the regulations used by a state to reduce air pollution. The Clean Air Act requires that EPA approve each state implementation plan. Members of the public are given opportunities to participate in review and approval of state implementation plans.

Target Year A year in which a nonattainment area must recalculate its adjusted base year inventory for the post-1996 rate-of-progress plan (e.g., target years for extreme areas are 1999, 2002, 2005, 2008, and 2010).

Target Level of Emissions The maximum amount of emissions that a nonattainment area can emit for a given target year while complying with the post-1996 rate-of-progress plan requirements.

Uncontrolled Indicates that only effects of baseline control strategies is included in an emission inventory value.

Vehicle Miles Traveled (VMT): The total number of miles traveled in a given period of time (e.g., day, year) by a given vehicle or fleet of vehicles. VMT, combined with pollutant emission factors per mile traveled, provide an estimate of the total amount of vehicle pollution in a given period of time.

Volatile Organic Compound (VOC) Any compound of carbon, excluding CO, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate, which participates in atmospheric photochemical reactions. This includes any organic compound other than those EPA has determined to have negligible photochemical reactivity. VOCs are a subset of hydrocarbon (HC) emissions.

Weekday Average Monday through Friday